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Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Office of Secretary Of Defense									DATE: February 2010		
APPROPRIATION/BUDGET ACTIVITY 0400: Research, Development, Test & Evaluation, Defense-Wide BA 3: Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603781D8Z: Software Engineering Institute (SEI)							
COST (\$ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	29.056	31.044	30.910	0.000	30.910	31.252	31.640	32.154	32.729	Continuing	Continuing
P781: Software Engineering Institute (SEI)	26.283	23.634	23.294	0.000	23.294	23.601	23.952	24.416	24.934	Continuing	Continuing
P783: Software Producibility Initiative	2.773	7.410	7.616	0.000	7.616	7.651	7.688	7.738	7.795	Continuing	Continuing
A. Mission Description and Budget Item Justification											
Software is key to meeting DoD's increasing demand for high-quality, affordable, and timely national defense systems. There is a critical need to rapidly transition state-of-the-art technology and best practices to improve the acquisition, engineering, fielding, and evolution of software-intensive DoD systems.											
Starting in 2009, Project 781 funds the technology development and transition activities of the Software Engineering Institute (SEI) at Carnegie Mellon University. The SEI is an R&D Laboratory Federally Funded Research and Development Center (FFRDC) sponsored by the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics. It was established in 1984 as an integral part of the DoD's software initiative to identify, evaluate, and transition high-leverage software engineering technologies and practices. The SEI fosters disciplined software engineering practices by DoD acquisition and life-cycle support programs and by the industrial base where the bulk of defense software is produced. The Institute works across government, industry, and academia to: (1) improve current software engineering activities from acquisition, technical, and management perspectives; (2) facilitate rapid, value-added transition of software engineering technology into practice; and (3) evaluate and calibrate emerging software engineering technologies to determine their potential for improving the evolution of software-intensive DoD systems.											
The SEI enables the exploitation of emerging software technology by bringing engineering discipline to software acquisition, development, and evolution. The SEI focuses on software technology areas judged to be of the highest payoff in meeting defense needs. FY 2005 focus areas were: Acquisition Practices for DoD Software- Intensive Systems (including pilot demonstrations of new technologies, dissemination of lessons learned, and provision of selected important services to the DoD acquisition community); Software Engineering Technical Practices (including survivable systems practices, software architecture technology, software component technology, performance-critical systems, and integration of software-intensive systems); and Software Engineering Management Practices [including personal and team software development processes, software engineering measurement and analysis, and Capability Maturity Model Integration (CMMI)].											
P783 of this funding line includes the Software Produceability Initiative. The role of software in major Defense acquisition programs has been steadily increasing. Much of the mission functionality demanded from programs such as F/A-22, JSF, Future Combat System, and many others is embodied in large, complex software											

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0400: Research, Development, Test & Evaluation, Defense-Wide		PE 0603781D8Z: Software Engineering Institute (SEI)			
BA 3: Advanced Technology Development (ATD)					
<p>systems. Shortcomings in software development often lead to schedule slippage, cost growth, and mission compromises. These shortcomings can frequently be traced to underpowered software development technologies not up to the task of developing the scale and complexity of software needed. Despite the large role of the commercial sector in advancing software technology, there are many key aspects of complex, distributed, robust systems crucial to DoD that are not being addressed directly by commercial technology efforts, as our experience over the past decade shows. The Software Produceability Initiative will focus on developing and transitioning more powerful and effective software development science, techniques, tools, and technologies to improve our ability to design, build, test and sustain software and software intensive systems.</p> <p>This PE also includes support to find, evaluate, and test innovative technologies emerging from non-traditional sources. Private sector investment has created rapid advances in technology primarily in information technology and related electronic components and devices. Obtaining an early, accurate understanding of the technological advances that are emerging from small, innovative companies has been problematic for the Department of Defense (DoD) due to these types of companies either overlooking or even avoiding federal sales opportunities. Further, once such innovative technologies become commercially available they can be rapidly obtained by insurgents for terrorist actions. These funds will be used to discover emerging technologies, evaluate their potential to fit DoD needs, and where appropriate conduct critical tests of the components or software under DoD conditions. T he facilitation of early interactions and meaningful information exchanges between the innovative companies and DoD users will accelerate the application of emerging technical solutions to DoD needs, reduce development costs, and avoid potentially disastrous technological surprises from insurgent use of such new technology. In addition, it is important to understand how developments in commercial technology might impact existing DoD programs and systems. Equally important, new commercial technologies may require new DoD policies on the use of the technology or a modification to existing DoD policy.</p>					
B. Program Change Summary (\$ in Millions)					
	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Previous President's Budget	31.244	31.298	0.000	0.000	0.000
Current President's Budget	29.056	31.044	30.910	0.000	30.910
Total Adjustments	-2.188	-0.254	30.910	0.000	30.910
• Congressional General Reductions		0.000			
• Congressional Directed Reductions		0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds		0.000			
• Congressional Directed Transfers		0.000			
• Reprogrammings	-1.104	0.000			
• SBIR/STTR Transfer	-0.852	0.000			
• Other Program Adjustments	-0.232	-0.254	30.910	0.000	30.910

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COST (\$ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
P781: <i>Software Engineering Institute (SEI)</i>	26.283	23.634	23.294	0.000	23.294	23.601	23.952	24.416	24.934	Continuing	Continuing

A. Mission Description and Budget Item Justification

Software Engineering Institute is key to meeting the Department of Defense's (DoD's) increasing demand for high-quality, affordable, and timely national defense systems. There is a critical need to rapidly transition state-of-the-art technology and best practices to improve the acquisition, engineering, fielding, and evolution of software-intensive DoD systems.

The SEI enables the exploitation of emerging software technology by bringing engineering discipline to software acquisition, development, and evolution. The SEI focuses on software technology areas judged to be of the highest payoff in meeting defense needs.

Private sector investment has created rapid advances in technology primarily in information technology and related electronic components and devices. Obtaining an early, accurate understanding of the technological advances that are emerging from small, innovative companies has been problematic for the DoD due to these types of companies either overlooking or even avoiding federal sales opportunities. Further, once such innovative technologies become commercially available they can be rapidly obtained by insurgents for terrorist actions. DoD needs opportunities to discover emerging technologies, evaluate their potential to fit DoD needs, and where appropriate conduct critical tests of the components or software under DoD conditions. Facilitating early interactions and meaningful information exchanges between the innovative companies and DoD users will accelerate the application of emerging technical solutions to DoD needs, reduce development costs, and avoid potentially disastrous technological surprises from insurgent use of such new technology. Based on workshops and interactions with these companies and the DoD acquisition community in 2007 and 2008, the need emerged for funding to support rapid evaluation and test of these technologies that can't be accommodated by the normal acquisition program budget process.

B. Accomplishments/Planned Program (\$ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Acquisition Practices for DoD Software Intensive Systems - (Acquisition Support Program - ASP)	2.795	2.780	2.613	0.000	2.613
<i>FY 2009 Accomplishments:</i> * Identified potential areas of focus to address common areas of concern across multiple programs.					

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
<p>* Explored methods to assist with gathering and organizing information about a program in a way that graphically represents the relationships among key decisions, events, and circumstances that occur on the program.</p> <p>* Investigation of Systems Thinking and research application of that to acquisition in support of development of the archetypes.</p> <p>* Collaboration with University Carlos III in Spain to extend archetype work to solution space</p> <p>* Command and Control Study in collaboration with other FFRDCs to answer whether there were any show-stopper risks in migrating to a common command and control for satellites systems</p> <p>* Updates for and delivery of DAU course</p> <p><i>FY 2010 Plans:</i></p> <p>* Identify opportunities for the SEI to create, apply, and amplify technologies that respond to customer needs.</p> <p>* Explore new mechanisms for more effective one-to-many dissemination of and collaboration on software acquisition and engineering knowledge.</p> <p>* Accelerate the transition of methods and technologies developed by other SEI technical programs to assist DoD.</p> <p>* Find connections between similar software engineering problems and shared solution sets within and across DoD components and federal agencies.</p> <p>* Document lessons learned, success stories, practical guidance, and tools and techniques that can be used to increase positive project outcomes and reduce program risk.</p> <p>* Facilitate communications between SEI and other external organizations such as industry associations, DoD initiatives, and communities of practice to disseminate successful methods and technologies.</p> <p>* Educate acquisition executives who attend advanced Defense Acquisition University (DAU) training in the challenges of software engineering and acquisition and help them identify improved practices to apply to their programs.</p>						

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
<p>* Capture knowledge from engagements with acquisition programs and organizations to identify patterns and trends, and then help impart this knowledge to the acquisition community through conferences, workshops, courses, briefings, technical reports, articles, advocacy, and participation in acquisition communities of practice.</p> <p><i>FY 2011 Base Plans:</i> Continuation and expansion of FY2010 Plans: * Identify opportunities for the SEI to create, apply, and amplify technologies that respond to customer needs. * Explore new mechanisms for more effective one-to-many dissemination of and collaboration on software acquisition and engineering knowledge. * Accelerate the transition of methods and technologies developed by other SEI technical programs to assist DoD. * Find connections between similar software engineering problems and shared solution sets within and across DoD components and federal agencies. * Document lessons learned success stories, practical guidance, and tools and techniques that can be used to increase positive project outcomes and reduce program risk. * Facilitate communications between SEI and other external organizations such as industry associations, DoD initiatives, and communities of practice to disseminate successful methods and technologies. * Educate acquisition executives who attend advanced Defense Acquisition University (DAU) training in the challenges of software engineering and acquisition and help them identify improved practices to apply to their programs. * Capture knowledge from engagements with acquisition programs and organizations to identify patterns and trends, and then help impart this knowledge to the acquisition community through conferences, workshops, courses, briefings, technical reports, articles, advocacy, and participation in acquisition communities of practice.</p>						
Software Engineering Technical Practices (Networked Systems Survivability Program - NSS)		3.898	3.977	3.952	0.000	3.952

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2009 Accomplishments: * Transitioned vulnerability analysis and malicious code analysis tools and techniques to response teams with national responsibility. * Expanded pilot opportunities, transitioned resiliency engineering concepts through coursework, and performed independent assessments of organizational competency for select customers. * Transitioned security practices, tools, and methodologies to the DoD information assurance workforce through the Virtual Training Environment. * Expanded on the work initiated with the Air Force Cyber Command Task Force to transition computer network operations, risk management, and force development capabilities to AF Cyber. * Matured and transitioned emerging technologies generated by work in network-centric operations and systems of systems, addressing how to operate effectively in an environment that requires large scale distributed collaboration and is constrained by acquisition practices. * Published new model of insider theft of intellectual property. * Developed the CERT Resiliency Management Model Capability Appraisal methodology and methodology artifacts.						
FY 2010 Plans: * Develop training courses and workshops for the Resiliency Management Model. * Develop functional extraction-based tools for correctness verification and component composition. * Identify and establish techniques and tools needed to embed software and system assurance in all aspects of system development lifecycle; develop prototype measures of the security improvement brought about by each technique and tool. * Work with the DoD's DISA, JTF-GNO, and NSA NTOC to extend, adapt, and apply NSS network situational awareness, malicious code, and forensics tools on adversary activity present on systems running on NIPR Net, SIPR Net, and the DREN. * Improve the effectiveness of the intrusion analysis and response team community by developing cyber defense exercises that are made available through the SEI's Virtual Training Environment and its XNET virtual network exercise platform.						

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
<ul style="list-style-type: none">* Integrate insider threat research analysis and findings into new technologies for the detection and prevention of malicious insider activity.* Create and transition security event detection gap-area tools that provide commercially unavailable capabilities.* Improve the survivability and resiliency of the program's stakeholders by developing and transitioning disciplined improvement approaches including management improvement models (such as the Resiliency Management Model), security assessment methods, compliance validations, and threat analysis, modeling, and mitigation techniques.* Provide practical guidance for identifying and managing insider threats and other risks.* Continue to research and develop secure coding standards for C++ and Java and complete initial version for each.* Automate SQUARE for acquisition and privacy, and transition.*Conduct new research in the areas of evaluating embedded system functionality and security, detecting mutating malware, and using trusted hardware for cyber security. <p>FY 2011 Base Plans:</p> <ul style="list-style-type: none">* Define a C language software certification process and establish the CERT SCALE (Source Code Analysis Lab).* Develop C language static analysis tool certification process.* Refine the Building Assured Software Framework and associated metrics and initiate transition activities that support adoption by other organizations, designers and developers.* Support FX transition by continuing evolution of the FX/MC system for malware analysis and develop demonstrations of FX application to test and evaluation activities.* Continue to support the DHS software assurance effort and associated working groups and to expand the content for the Build-Security-In website.* Develop and publish an ISO/IEC Type II Technical Report "Secure Coding Guidelines" based on the CERT C Secure Coding Standard to include only analyzable guidelines and targeted towards source code analysis tool vendors.						

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
* Develop “Annex K Analyzable” for the C1X major revision to the C language standard and prototype using GCC. * Assess the capabilities and limitations of hardware based trusted computing and recommend potential extensions of the trusted computing model * Research national and sector-based practices in critical information infrastructure (CII) asset, threat, and vulnerability identification and analysis. * Continue to collect, codify, and analyze insider threat cases; research and develop predictive threat models and detection strategies. * Research, develop, and apply conceptual frameworks and technologies to train and evaluate cyber workforce mission readiness. * Refine and extend XNET user interface and backend platform infrastructure to support large scale, globally distributed training exercises for the DoD, NATO, and federal and state governmental agencies. * Refine information security risk assessment methodologies to meet broader community and sector needs, conduct assessments and compliance validations, and establish a community of practice for CII. * Develop, facilitate pilot testing, and begin transition of prevention and detection methodologies and tools for insider threat/ espionage. * Transition CERT Forensics tools and technologies.						
Software Engineering Technical Practices (Research, Technology, and Systems Solutions - RTSS) *Also Includes IRAD dollars FY 2009 Accomplishments: * Developed a model to determine the benefits of architectural refactoring by correlating change propagation cost to change history (paper to be published).		9.869	13.351	13.223	0.000	13.223

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
<p>* Made modifications to system and Systems of systems (SoS) architecture evaluation methods to accommodate enterprise architecture, and developed a body of anecdotal evidence supporting their effectiveness (applied in customer setting).</p> <p>* Completed an Architecture Competence Reference Model and an associated diagnostic instrument, which can be used to assess the architecture competence of organizations.</p> <p>* Developed an approach for “equation-carrying models’ to be used in the model-based engineering of real-time systems.</p> <p>* Investigated how a “gated” DoD acquisition community can be incentivized to behave like the open source software community and how modularity can provide a catalyst for innovation in this community (white paper written).</p> <p>* Developed linear decision diagrams (LDD) and large-block predicate abstraction for software, both of which combine scalable model checking and static analysis to reason efficiently about the runtime behavior of software (papers published).</p> <p>* Identified challenges of SoS requirements engineering and developed an initial approach to address these challenges (report published).</p> <p>* Completed SMART transition guidance consisting of process and activity descriptions, questions to elicit data, templates for each of the outcomes, licensing guidelines, and reports describing the process.</p> <p>* Defined a set of Governance and Acquisition methods for SoS. These methods are designed to be ultimately integrated with engineering practices for SoS.</p> <p>* Completed an analysis of the software assurance landscape, including key players and their relationships (paper published).</p> <p><i>FY 2010 Plans:</i></p> <p>* Investigate architecture approaches for self-regulating and self-adapting behavior in ultra-large-scale (ULS) systems.</p> <p>* Develop an integrated approach for quality attribute specification and evaluation for software, system, and SoS architectures.</p>						

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
<ul style="list-style-type: none">* Develop materials suitable for educating executives and high-level managers on the importance of architecture-centric engineering.* Investigate an approach for quantitative impact and tradeoff analysis among dependent quality attributes.* Develop automated support for detecting architectural violations in source code.* Develop preliminary techniques for evaluating ULS architecture from a socio-technical perspective.* Investigate static verification for safety and security problems that crosscut software implementation and design.* Develop a concept demonstration that applies computational mechanism design and swarm theory to address computationally emergent behavior, intended to be applicable to UAVs.* Analyze security threat and vulnerability data leading to preventative or adaptive architecture design strategies.* Investigate techniques for establishing justified confidence in and-to-end quality attribute behavior in networked systems.* Investigate the feasibility and surrounding issues with emerging SoS technologies, such as cloud computing.*Determine architecture principles for service-oriented systems that can be applied to SoS.*Investigate and report on approaches for testing SoSs.* Expand the SMART family to address the enterprise service portfolio and the infrastructure and environment.* Produce case studies showing impediments to achieving justified confidence in the behavior of SoS.* Develop an approach for using evidence to make architecture-centric arguments throughout the development life cycle. <p>FY 2011 Base Plans:</p> <ul style="list-style-type: none">* Develop analytic foundations and generalized quality attribute theories for architecture-centric engineering.* Develop a scalable approach for applying static verification techniques.						

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		FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
<ul style="list-style-type: none">* Extend architecture analyses for system evolution by using economic theories.* Develop new theories and analytic techniques that accommodate and exploit emerging and potentially disruptive platforms including multi-core, mesh networking, and other developments.* Develop tools and analytic techniques to detect and eliminate potential security vulnerabilities for mission-critical systems.* Produce customer-oriented proof-of-concept prototypes of innovative ACE technologies and system solutions.* Define what architecture specification, design, representation, evaluation, and evolution mean for systems of increasingly large scale.* Conduct applied research in using mechanism design to align various system stakeholders for large scale system development, and in using computational mechanism design for resource arbitration.* Develop and refine methods for architecture evaluation, comparison, design, implementation, evolution, reconstruction, and documentation.* Develop and refine practicable techniques for performing quantitative and qualitative analyses throughout the development life cycle.* Develop standard architecture specification language in support of performing quantitative analyses.* Develop techniques to narrow the gap between architecture and implementation artifacts.* Integrate methods and tools into a life cycle approach and provide bridges to other processes and architecture efforts.* Develop models, measures and improvement strategies for architecture competence.* Develop and mature methods for evolving architectures.						
Software Engineering Management Practices - SEPM FY 2009 Accomplishments: <ul style="list-style-type: none">* Improved the efficiency of the CMMI Product Suite's usage in order to increase its utility in all sizes of organizations.* Maximized the interoperability of multiple CMMI constellations including CMMI for Development and CMMI for Acquisition due to the blend of activities seen in many DoD and other agencies.		4.768	3.526	3.506	0.000	3.506

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
<ul style="list-style-type: none">* Continued to improve the value and integrity of CMMI appraisals.* Supported a series of user workshops to define the requirements for a CMMI Version 1.3.* Continued to improve the understanding of and guidance on High Maturity.* Addressed full certification of SCAMPI Lead Appraisers.* Released new packaging of the Intermediate Concepts of CMMI to improve understanding and implementations of CMMI levels 2 and 3.* Increased auditing of Level 2 and 3 appraisals.* Released the CMMI for Services constellation.* Developed evaluation criteria in support of the Measurement & Analysis Infrastructure Diagnostic (MAID) method.* Conducted a survey on the adoption, use, and quality and performance outcomes of measurement practices and technologies.* Conducted a survey of high maturity lead appraisers regarding their observations and experiences with high maturity measurement and analysis practices.* Conducted two surveys on the state of the practice for measurement and analysis with one focusing on a broad sample of the community and the other targeted on high maturity organizations and practices.* Led US representation on the development of international software and systems engineering standards addressing quality modeling, evaluation, and measurement.* Completed about 25 of 45 change packages for CMMI V1.3. <p>* Conducted background research into the synthesis of modern requirement development methods and text analysis techniques to create a methodology for more effective elicitation and development of system requirements (partially line funded).</p> <p>FY 2010 Plans:</p> <ul style="list-style-type: none">* Continue stewardship functions for CMMI.						

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
<ul style="list-style-type: none">* Respond to CMMI Steering Group direction on new activities to support user requirements including additional constellations, improvements to appraisals' effectiveness and efficiency, and improved user understandings and implementation.* Release CMMI v1.3, resolving incompatibilities across the existing constellations and improving the definitions of and guidance on the high maturity level Process Areas.* Create CMMI v1.3 SCAMPI Appraisal Method Definition.* Research modeling and analysis techniques to assist organizations with their use within the acquisition and services domains.* Research options to create more efficient CMMI models and appraisal methods that increase their utility yet maintain their integrity.* Research and characterize new areas of practice that should be covered in CMMI (e.g., security, architecture, SoS stakeholder collaboration).* Research factors that enhance/constrain program performance (e.g., requirements volatility) and mitigations.* Research synergies between emerging technologies and CMMI (e.g., agile principles, team management).* Research candidate new high maturity best practices.* Ensure CMMI architecture permits controlled growth and effective use of CMMI models.* Conduct research into the state of the practice for measurement and analysis practices.* Produce a body of knowledge related to the relationship of CMMI and Six Sigma. <p>FY 2011 Base Plans:</p> <ul style="list-style-type: none">* Adapt Designing Products and Processes using Six Sigma to CMMI-SVC constellation.*Develop course on quantitative techniques for high maturity project management and adapt it to CMMI-ACQ.* Conduct research via surveys and workshops into effective modeling and analysis practices related to services and operations.						
Technology from Non-Traditional Sources		4.953	0.000	0.000	0.000	0.000

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B. Accomplishments/Planned Program (\$ in Millions)								
				FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
<p><i>FY 2009 Accomplishments:</i></p> <ul style="list-style-type: none"> * Program plans for a new start with FY 2009 funding were developed to find, evaluate, and experiment with innovative technologies emerging from non-traditional sources. * Competitively recruited 10-15 of the country's best venture capitalists to serve as consultants on innovative technologies emerging from non-traditional sources. * Conducted five workshops/roundtables etc with active participation from the operator and requirements communities to discover private sector technologies (information, electronics, and devices) that deliver capability at optimum cost to the warfighter. * Completed Navy workshop at SPAWAR to define Navy needs for emerging innovative IT/electronic technologies. * Established a focused effort at NRL to identify and conduct critical experimentation on revolutionary products emerging from non-traditional sources. <p>Effort transferred to Project 783 in 2010 and beyond.</p>								
Accomplishments/Planned Programs Subtotals				26.283	23.634	23.294	0.000	23.294
C. Other Program Funding Summary (\$ in Millions)								
N/A								
D. Acquisition Strategy								
N/A								
E. Performance Metrics								
<p>Strategic Goals Supported: Improve ability to acquire systems; Value to taxpayer</p> <p>Existing Baseline: Value to Customer; Contract Billings; Performance and Cost review.</p> <p>Planned Performance Improvement / Requirement Goal: Average rating of 4 or higher; All costs are allowable and allocable; Less than 5% of programs unsatisfied.</p> <p>Actual Performance Improvement: 4.33</p>								

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Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> BA 3: <i>Advanced Technology Development (ATD)</i>	R-1 ITEM NOMENCLATURE PE 0603781D8Z: <i>Software Engineering Institute (SEI)</i>	PROJECT P781: <i>Software Engineering Institute (SEI)</i>
Actual Performance Metric / Methods of Measurement: 1-5		

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Exhibit R-2A, RDT&E Project Justification: PB 2011 Office of Secretary Of Defense								DATE: February 2010			
APPROPRIATION/BUDGET ACTIVITY 0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603781D8Z: <i>Software Engineering Institute (SEI)</i>				PROJECT P783: <i>Software Producibility Initiative</i>			
COST (\$ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
P783: <i>Software Producibility Initiative</i>	2.773	7.410	7.616	0.000	7.616	7.651	7.688	7.738	7.795	Continuing	Continuing

A. Mission Description and Budget Item Justification

The role of the Software Producibility in major Defense acquisition programs has been steadily increasing. Much of the mission functionality demanded from programs such as F/A-22, JSF, Future Combat System, and many others is embodied in large, complex software systems. Shortcomings in software development often lead to schedule slippage, cost growth, and mission compromises. These shortcomings can frequently be traced to underpowered software development technologies not up to the task of developing the scale and complexity of software needed. Despite the large role of the commercial sector in advancing software technology, there are many key aspects of complex, distributed, robust systems crucial to DoD that are not being addressed directly by commercial technology efforts, as our experience over the past decade shows.

This initiative will conduct integrated program of research from basic through dem-val that advances the state-of-the art in produceability of software for DoD systems, particularly those systems characterized by high complexity, need for robustness, information assurance, real-time performance, and physical distribution. Research and transition efforts will pursue technical goals to (1) meet and ensure mission-critical requirements; (2) control complexities; (3) enable system evolution; (4) ensure seamless interoperability; and (5) model behavior and performance.

Invest in promising software technologies involving (1) specification of complex requirements; (2) correct-by-construction software development; (3) composable and customizable frameworks; (4) high-confidence system software and middleware; (5) system architectures for network-centric environments; (6) technologies for testing, verification, and validation, and (7) modeling and metrics. Additionally, software and systems development researchers would serve as experts to advise ongoing acquisition programs.

Private sector investment has created rapid advances in technology primarily in information technology and related electronic components and devices. Obtaining an early, accurate understanding of the technological advances that are emerging from small, innovative companies has been problematic for the Department of Defense (DoD) due to these types of companies either overlooking or even avoiding federal sales opportunities. Further, once such innovative technologies become commercially available they can be rapidly obtained by insurgents for terrorist actions. DoD needs opportunities to discover emerging technologies, evaluate their potential to fit DoD needs, and where appropriate conduct critical tests of the components or software under DoD conditions. Facilitating early interactions and meaningful information exchanges between the innovative companies and DoD users will accelerate the application of emerging technical solutions to DoD needs, reduce development costs, and avoid potentially disastrous technological surprises from insurgent use of such new technology. Based on workshops and interactions

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with these companies and the DoD acquisition community in 2007 and 2008, the need emerged for funding to support rapid evaluation and test of these technologies that can't be accommodated by the normal acquisition program budget process.					
B. Accomplishments/Planned Program (\$ in Millions)					
	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Software Producibility	2.773	2.902	2.965	0.000	2.965
<p>This initiative will conduct integrated program of research from basic through dem-val that advances the state-of-the art in produceability of software for DoD systems, particularly those systems characterized by high complexity, need for robustness, information assurance, real-time performance, and physical distribution. Research and transition efforts will pursue technical goals to (1) meet and ensure mission-critical requirements; (2) control complexities; (3) enable system evolution; (4) ensure seamless interoperability; and (5) model behavior and performance.</p> <p>Invest in promising software technologies involving (1) specification of complex requirements; (2) correct-by-construction software development; (3) composable and customizable frameworks; (4) high- confidence system software and middleware; (5) system architectures for network-centric environments; (6) technologies for testing, verification, and validation, and (7) modeling and metrics. Additionally, software and systems development researchers would serve as experts to advise ongoing acquisition programs.</p> <p><i>FY 2009 Accomplishments:</i> Continued execution of the Software and Systems Test Track. Completed 2007 research efforts in developing technologies for interoperable systems of systems. Matured business plan for gov/ industry co- investment in research, selected an implementation approach, and initiated the necessary agreements. Matured the SIS Producibility Technology Roadmap, achieved community consensus on priorities and measures. Promoted and monitored usage of the Systems and Software Test Track to provide a place (possibly virtual and not a single physical location) for experimental verification of Software-Intensive Systems Producibility technologies due to their novelty and the potential complexity of the underlying theories. The experimental platforms incorporated software technology</p>					

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B. Accomplishments/Planned Program (\$ in Millions)						
		FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
to instrument, monitor and test large- scale applications. The experimental platform research included subtasks to conduct large-scale coordination experiments, and developed methods and tools for evaluating aggregate performance of applications. This environment provided a full range of collaborative technology challenges, run-time platforms and applications, experiments, evaluations, and demonstrations. A Common infrastructure enabled control and data flow between both kinds of application components for a distributed environment. The open experimentation environment provided the fundamental reference architecture and underpinnings helping researchers to develop and test their designs as well as facilitates transition of promising technologies into production use. Initiated a research topic in interoperability to address software techniques to improve system of system interoperability. Reviewed previously awarded contracts to develop and transition new methodologies, tools, technologies and techniques that improve DoDs ability to acquire software for large, net-centric warfighting systems of systems. Released a Broad Area Announcement (BAA) with subsequent award for community based technology efforts, such as reusable SW library or populating existing toolsets with domain-specific knowledge for application to a DoD-specific need, such as military avionics, communications, or platform control.						
FY 2010 Plans: Initiate 2-3 new efforts based on mature technology roadmap. Sustain experimentation on the Software and Systems Test Track. Continue DoD-specific community based technology effort awarded in 2008.						
FY 2011 Base Plans: Continue to execute the 2-3 new efforts started in 2010. Sustain experimentation on the Software and Systems Test Track. Initiate a new DoD-specific community based technology effort based on the technology roadmap and results from the 2008-10 efforts.						
Technology from Non-Traditional Sources Transferred from P781 in FY2010 and beyond.		0.000	4.508	4.651	0.000	4.651

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B. Accomplishments/Planned Program (\$ in Millions)								
				FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2010 Plans: * Continue and further refine use of experimentation funds to promote technology transfers into the DoD. * Hold a minimum of four workshops. * Perform a survey to identify all successful technology transfers. * Assist in the transfer of five technologies into the DoD. FY 2011 Base Plans: Continue workshops and technology assessment.								
Accomplishments/Planned Programs Subtotals				2.773	7.410	7.616	0.000	7.616
C. Other Program Funding Summary (\$ in Millions)								
N/A								
D. Acquisition Strategy								
N/A								
E. Performance Metrics								
Strategic Goals Supported: Improve ability to acquire systems; Value to taxpayer; Value to taxpayer.								
Existing Baseline: Value to Customer; Contract Billings; Performance and Cost review.								
Planned Performance Improvement / Requirement Goal: Average rating of 4 or higher; All costs are allowable and allocable; Less than 5% of programs unsatisfied.								
Actual Performance Improvement: 4.33								
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